



IOCH

Immunization and Other Child Health Project

**Vaccination Coverage Survey in the
Jessore Municipality
October 20 – 30, 2000
Survey Report No. 23**

**This survey was conducted by IOCH, a project of Management Sciences for Health,
funded by USAID under AID contract No. HRN-I-01-98-00033-00, Task Order No. 01**

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February 2001

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Acronyms

BCC	Behavior Change Communication
BCG	Bacillus of Calmette and Guerin
CES	Coverage Evaluation Survey
COSAS	Coverage Survey Analysis System
DPT	Diphtheria, Pertussis and Tetanus
EPI	Expanded Program on Immunization
FWC	Family Welfare Center
IOCH	Immunization and Other Child Health
Mahallah	Smaller localities (smaller than a village)
MOHFW	Ministry of Health and Family Welfare
Mouza	Smallest administrative locality in an Upazila
MSH	Management Sciences for Health
NGO	Non Governmental Organization
NID	National Immunization Day
OPV	Oral Polio Vaccine
TT	Tetanus Toxoid
WHO	World Health Organization

Terminology

This provides the meaning of some of the more technical terms used in this report and a brief explanation of their use.

By card: An immunization given to a child is termed as by card if the date of the dose is entered on an immunization card. Only doses recorded by card are treated as valid data in this survey.

By history: Immunization history collected from a parent's recall is termed as by history. Often no date will be mentioned. This information is only included in crude data.

Crude coverage rate is calculated from the doses recorded by card and/or by history. It is not ascertained whether the doses were given at the correct age and/or following the correct interval (where applicable). Crude data however, helps us to understand how much additional coverage could be achieved if all vaccines were given at the optimum age for the child and following the optimum interval. It also provides useful information on access to the EPI program and on the operational aspects of the provision of health services.

Valid coverage rate is calculated from the vaccinations recorded by card. Valid data includes only the doses of vaccines that were given after the minimum date of eligibility and/or after the minimum interval necessary to be effective and to protect the child. There is no maximum interval for a dose and therefore a dose administered after 52 weeks is still regarded as valid. By comparing crude coverage with valid coverage data of any particular antigen, one can determine how much coverage was lost due to the inability to give vaccine at the appropriate time.

Invalid doses are those administered at the wrong age and/or at the wrong interval. Doses administered before the minimum age in the case of DPT/Polio 1st doses and Measles vaccine or with less than four weeks interval in the case of DPT or Polio vaccines are classified as "invalid" doses.

The **criteria for a valid dose** used in this survey is the criteria recognized by the Bangladesh EPI program: minimum age for DPT/Polio 1st dose - 6 weeks old; minimum DPT/Polio interval - 4 weeks; minimum age for Measles vaccine - 38 weeks old.

Program access is measured by the percentage of children surveyed who received DPT 1st dose (crude data – by card and history) in the routine immunization session.

Fully immunized means the child has received all the doses it requires (BCG, OPV 1-3, DPT 1-3 and measles).

Missed opportunity refers to a visit of a child to a vaccination center for a dose that he received. However at that time he was also eligible for another dose of antigen that he did not receive. If the missed dose was provided at a later date, it is a *corrected missed opportunity*. If not, it is an *uncorrected missed opportunity*.

Executive Summary

Background

During October 20-30, 2000 a coverage evaluation survey was conducted by IOCH in Jessore Municipality as a part of ongoing evaluation of EPI program with the following objectives,

Objectives

The principal objectives of the survey were to assess:

- a) the levels of routine immunization coverage of children (12-23 months);
- b) the levels of TT immunization coverage in women of child bearing age (15-49 years) regardless of their marital status and
- c) the OPV and Vitamin A coverage levels achieved during the seventh NIDs conducted in April-May 2000.

Coverage levels for the routine immunization of children

Access: 96% of the children received at least one dose of antigen (DPT 1st dose in this case) from routine immunization sessions based on crude data (card plus history). Only 5% children never received a dose of any antigen.

Crude coverage between 12-23 months: 97% children received BCG, 90% received three doses of OPV and DPT and 81% received measles vaccine. About 81% children were fully immunized

Valid coverage between 12-23 months: 97% children received BCG, 82% received three doses of OPV and DPT and 79% received measles vaccine. 73% children were fully immunized

Valid coverage by 12 months: 97% children received BCG, 79% received three doses of OPV and DPT and 76% received measles vaccine. 69% were fully immunized

Source of immunization and distance of immunization center: Childhood immunization was provided mostly by NGOs (52%) in this area. Municipal EPI centers provided 34% of the vaccinations and Government hospitals provided only 10%. All the children resided within half-an-hour walking distance of the immunization centers.

Reasons for partial immunization of children: The main reasons for partial immunization were the lack of knowledge of the parents/caretakers about the need to return for the subsequent doses (27%). Some parents cited 'Sickness of the child' as a reason for non-compliance to immunization schedule.

Problems detected: Although access to immunization was fairly high, there was 6% dropout from DPT1 to DPT3 and 15% from DPT1 to Measles vaccine and a number of invalid doses due to early immunization (6% for DPT1 and 3% for Measles vaccine). However, prevalence of uncorrected missed opportunity was very low (less than 1%). Child immunization cards were available in only 53% of the cases and were lost in 41% cases. Six percent cases did not have any card. Only 43% of the parents could mention correctly the least number of times (i.e. 4 times) needed to visit the immunization sessions to get a child fully immunized.

Coverage levels for the routine TT immunization of women

About 78% of women of childbearing age (15-49 years) received a first dose of TT. 73% women received two doses and only 13% women received five doses of TT vaccine. 22% of the women never received any immunization.

Reasons for non-immunization and partial immunization of women: The major reason cited for non-immunization was that the women were unaware of the need for immunization (63%). Another 30% women mentioned that there was no provision of TT vaccine when they had their pregnancies. Whereas the major reasons for partial immunization were that they were either unaware of the need for due doses of TT immunization (51%) or the health worker did not specify the date to return for the next dose of TT vaccine (19%).

Coverage levels for the seventh NID campaign

In Jessore Municipality, 96% children received OPV during the first round and 97% during the second round of the Seventh NID campaign. 96% of the children received OPV in both the rounds of the seventh NID campaign. Vitamin A capsules were given to 89% of the eligible children on the second round of the seventh NID campaign.

The main reasons for not receiving OPV/Vitamin A during the NIDs were the children were away from home on the NID day and the parents were unaware of the NIDs.

Health Workers (62%), miking (21%), friends and neighbours (22%) and television (19%) were the main source of information of the NID campaign. Poster was also mentioned as a source of information in 8% of the cases.

Suggested solutions

The survey indicates a need for appropriate information being given to parents/caretakers in an effective way about the importance of each child being fully immunized before 12 months of age, irrespective of sex and about how to achieve full immunization (the time and place of the immunization sessions and the number of doses required). All women, illiterate or literate, of childbearing age require adequate knowledge about how to prevent tetanus both for herself and for the new born with 5 doses of TT vaccination.

The poor quality of services, as reflected by the gap between access rate (crude data) and valid rate by one year (96% vs. 89% for DPT 1 and 81% by 76% for Measles) and dropout rates (15% for DPT 1 to Measles) could be improved by proper screening of eligibility of clients for each antigen at the time of vaccination, and by adequate counseling of mothers. Therefore, there is also a need for training to be given to the service providers to help them keep up to date with EPI policies and guidelines and increase their capacity for counseling parents about EPI.

Introduction

The routine EPI program in the municipalities is carried out by a variety of private and public providers at fixed (hospitals, clinics, dispensaries, etc.) and at outreach sites. NGOs and private practitioners also provide immunization services in many places. The doses of immunization provided are reported to the Municipal health authority either at the end of each immunization session (if it is provided by municipality) or on a monthly basis. After compilation, the data is submitted to the concerned Civil Surgeon's office that aggregates it with other Upazila EPI results within that district and sends it on to the EPI head office at Dhaka.

For many reasons (e.g. immunization provided to children older than the target age group, tendency for over reporting, underestimated target etc.) routine EPI coverage data is not that dependable^{5,7,8}. There are also clear indications that the health situation in most of the urban areas are worse than in the rural areas^{5,7,8,10,11}.

IOCH therefore decided to carry out a survey based on the WHO recommended EPI 30 cluster survey method¹ to obtain data on the status of the immunization coverage of the children and women living in Jessore Municipality area as well as on the operational profile of the provision of immunization services. Jessore Municipality was taken as an universe and 30 clusters were chosen through random sampling method (please see methodology in page 9).

Objectives

The overall objective of the survey was to assess the level of immunization coverage in Jessore Municipality. The specific objectives were to:

- a) assess the level of routine immunization coverage of the children (12-23 months) and find out the reasons for non immunization and partial immunization
- b) assess the level of TT immunization coverage among women of 15-49 years of age irrespective of their marital status and find out the reasons for non immunization and partial immunization
- c) assess the coverage levels of OPV and vitamin A administered during the seventh NID campaign.

Methodology

The survey followed the WHO recommended 30-cluster survey method¹, which has been widely used in many developing countries to assess immunization coverage. It is relatively simple and can be done at low cost (The survey methodology and its limitations are presented in **Annex A**). Briefly, the immunization information is collected on a randomly selected group of 210 children/women from 30 clusters (seven children/women per cluster) in a given community. It gives an estimate of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect of 2. Based upon prior experience with immunization coverage surveys, 30 clusters are generally thought to be necessary to yield sufficiently reliable data.

In this survey, seven children between 12-23 months (children born between October 25, 1998 to October 24, 1999) were selected from each cluster to ascertain their routine vaccination status. **Annex B** describes how the dates of eligibility of different antigens in routine immunization were determined for children. The seventh NID campaign was conducted on 23 April 2000 and 29 May 2000 in two rounds respectively throughout the country including the urban areas. Children born between May 29, 1995 and May 28, 2000 were selected for collecting information on NIDs.

Seven women between 15-49 years of age, irrespective of their marital status were selected to ascertain their tetanus toxoid vaccination status for routine immunization.

The 30 clusters (mouzas/mahallahs) were chosen randomly by IOCH from a list of the populations of mouzas and mahallahs in Jessore Municipality from the Bangladesh Population Census 1991. The list of selected clusters is given in **Annex C** and their location is shown on the following map. The WHO standard questionnaire was used in this survey for documenting the routine immunization status of children and women. Separate questionnaires were used for collecting the data on the NID campaign.

Data was collected by IOCH monitoring team. Data collection period was from October 20-30, 2000. Data entry and analysis was done by IOCH using COSAS 4.41³ and "EPI Info" programs. The final report was prepared by the Monitoring and Evaluation Unit, IOCH/MSH Project.

Limitations

Limitations of the 30-cluster survey method

Although the 30-cluster survey method is relatively simple, it has several limitations² that can be grouped into two types:

Linked to the sampling method:

- As an inherent bias in the sampling technique in 30 clusters, bigger mouzas are more likely to be selected as a cluster. The survey leaves out scattered small mouzas with poor access to services. It also does not reflect the lack of uniformity in service availability or the behavior of particular populations.
- There is a wide confidence interval (+/- 10%). It means that if the result shows 56% of children received a valid dose of measles before 12 months of age, then the “true” figure of measles immunization of children could be anywhere between $(56-10) = 46\%$ and $(56+10) = 66\%$. This type of survey is useful when the coverage is low but is less relevant to assess higher coverage or to compare surveys – unless there is a big difference between two surveys.
- To be relevant the analysis of valid data must apply to a relatively high percentage of available cards.

Linked to the implementation:

- The selection of the index house is key. Too often the proper method is not followed because the surveyors do not make the effort to number all the houses from their location to the end of the mouzas along the direction indicated by the bottle or by the pencil.
- If a household includes an eligible child who is not at home for a few hours, the surveyor often does not return later on but skips the house and substitutes another child. This is, of course, an incorrect procedure that introduces a bias.

It is also important to remember that this survey coverage data gives little information about the current program as it documents the activities of a year earlier.



Results

A. Routine immunization coverage of children

Coverage levels (card plus history data of COSAS analysis):

Table 1 shows the coverage levels of children between 12-23 months and their vaccination status at 12 months of age. The crude data figures for the 12-23 months age group indicate that 90% children received all three doses of OPV/DPT and 81% were vaccinated against measles. Also, 81% children were fully immunized. The valid coverage levels were 82% for DPT/ OPV third doses. 79% children were vaccinated against measles and 73% were fully immunized. However, the routine EPI program failed to reach to 3% children surveyed. Proportion of fully immunized children under one year of age (valid data) was only 69%.

Table 1: Routine immunization coverage levels of the children

Name of the vaccine	Coverage (%) Immunization of 12 - 23 months age group		Coverage (%) Immunized by 12 months of age
	Crude data (Access)	Valid data	Valid data
BCG	97	97	97
Polio 1	96	90	89
Polio 2	93	85	83
Polio 3	90	82	79
DPT 1	96	90	89
DPT 2	93	85	83
DPT 3	90	82	79
Measles	81	79	76
Fully immunized	81	73	69
Zero dose	3	-	

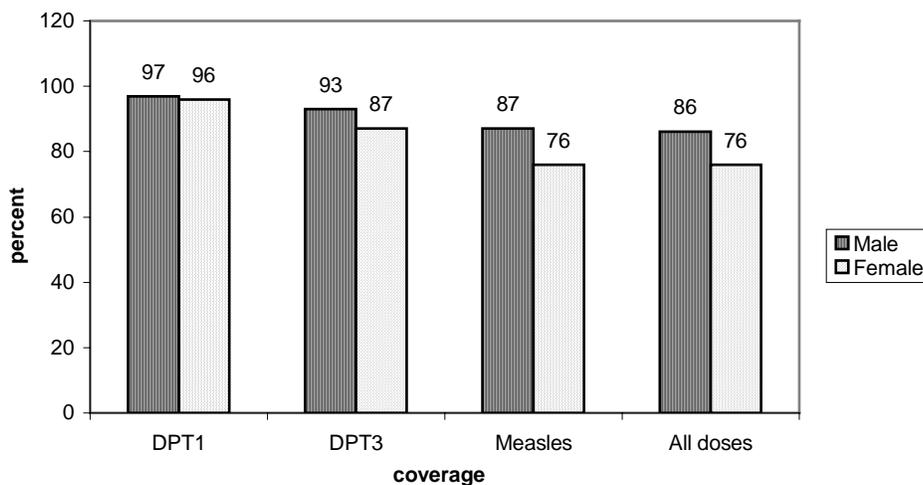
Table 1 shows little differences between the valid data of immunization by 23 months age group and the valid data by 12 months age group. It also indicates a considerable gap between access rates (crude data) and valid rate by one year (96% vs. 89% for DPT 1, and 81% versus 76% for Measles) and 81% vs. 69% for fully immunized, reflecting poor quality of services.

Immunization coverage by sex

The Chart-1 shows that there was no sex differential with regard to access to immunization as measured by the rate of DPT 1 (crude data). However, the dropout rates among the girls for different antigens (for DPT 3, Measles and fully immunized) were relatively higher than those for boys. Crude data shows that 93% boys completed the third dose of DPT but only 87% girls completed the DPT 3. Similarly, 87% boys received measles vaccine; on the other hand only

76% girls received it. The proportion of fully immunized boys was 10 percentage points higher than that of the girls.

Chart 1: Immunization coverage by sex



Distance to the immunization center

Immunization centers were located within 10 minutes walking distance in 90% of the cases and in 10% cases it was within half an hour (Table-2). This implies that all the centers were within the reach of the families. 54% walked to the immunization center, 45% used rickshaw as a mode of transport. A very negligible number of cases used other form of transports.

Table 2: Distance between the child’s home and the vaccination site

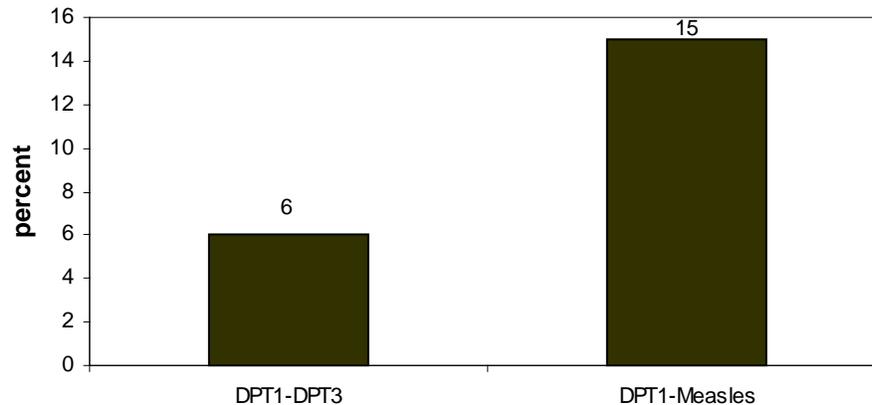
Time (minutes)	Percent
1-5	49
6-10	41
11-30	10

Program access [(percent of children surveyed who received DPT 1st dose (crude data - by card or history)]: The survey revealed 96% of children received a 1st dose of DPT indicating program was fairly accessible to the population.

Program continuity (dropout rate):

Crude data for antigens received by 12-23 months of age is used for calculating the dropout rate. In this survey, the DPT1 to DPT3 dropout rate was 6% and DPT 1 to measles dropout rate was 15% (Chart 2).

Chart 2: Dropout rates for childhood immunization



Program quality:

Adherence to the immunization schedule – invalid doses

Adherence to the immunization schedule is generally considered to be the major indicator of program quality. In Jessore, six percent children received an invalid dose of DPT1 and three percent received an invalid dose of measles vaccine (due to early age vaccination). Percentage of children receiving DPT second dose less than 4 weeks after the first dose was only one percent. No child received DPT third dose less than 4 weeks after the second. Providers' performance related to invalid doses, was quite good.

BCG vaccination

97% of the children received BCG vaccine based on crude data (card plus history data). 90% children were found with a BCG scar, but seven percent did not produce a visible scar.

Missed opportunities of immunization

The prevalence of uncorrected missed opportunities for immunization was very low (range 0% for DPT/OPV3 to 1% for Measles/BCG). This is a good side of the programme.

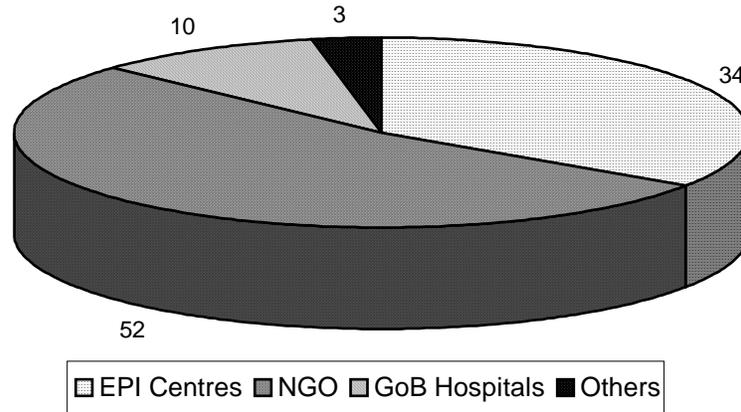
Availability of documentation of immunization

Child immunization cards were available in 53% of the cases and were lost in another 41% cases. Six percent did not have any card.

Providers of immunization

Chart 3 shows that childhood immunization is provided mostly by NGOs (52%) in this area. Municipal EPI centers provided 34% of the vaccination and the government hospitals provided 10%. For rest of the cases (3%), immunization was provided from private places or at home.

Chart 3: Providers of childhood immunization



Reasons for non-immunization and partial immunization of the children

Out of 210 children, 6 (3%) were not immunized. Two cases did not take the vaccine for the fear of side reaction. Another 2 children did not take vaccine as their mother were sick or was busy otherwise. 2 more cases had some other reasons.

Besides, 16% children were partially immunized. 27% of those parents whose children were partially immunized were not aware that they had to take their children to the immunization session again to complete the series. 12% were not aware about the importance of Measles vaccine. Another 18% was sick and was not taken to the vaccination site. 12% children were away from home.

Table 3: Reasons for partial immunization of the children

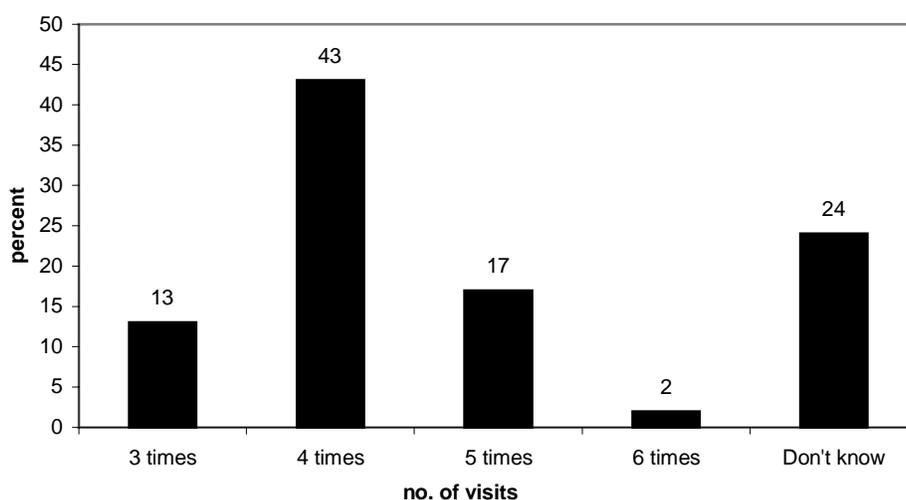
Reasons	Partially immunized (%)
Unaware of the need to vaccinate the child	4
Unaware that the child needs to be brought again for the 2nd/3 rd doses	27
Did not know when to return for 2nd/3 rd doses	9
Unaware about the importance of measles vaccine	12
Did not know when and where to go for vaccination	3
Vaccinator was not available at the vaccination site	3
Child was sick and not taken to the vaccination session	18
Sick child was taken to the vaccination site but vaccine not given	3
Mother was sick / family problem	9
Child not at home or away from home	12

Information and motivation for routine childhood immunization

Eighty-five percent of the parents could mention the correct age of completing vaccination series (between 9 and 12 months). However, 14% did not know the answer.

On the other hand (See Chart 4), 43% of the parents could mention correctly the least number of times needed to visit the immunization session to complete vaccination series (i.e. 4 times). However, one fourth of the parents did not know the answer.

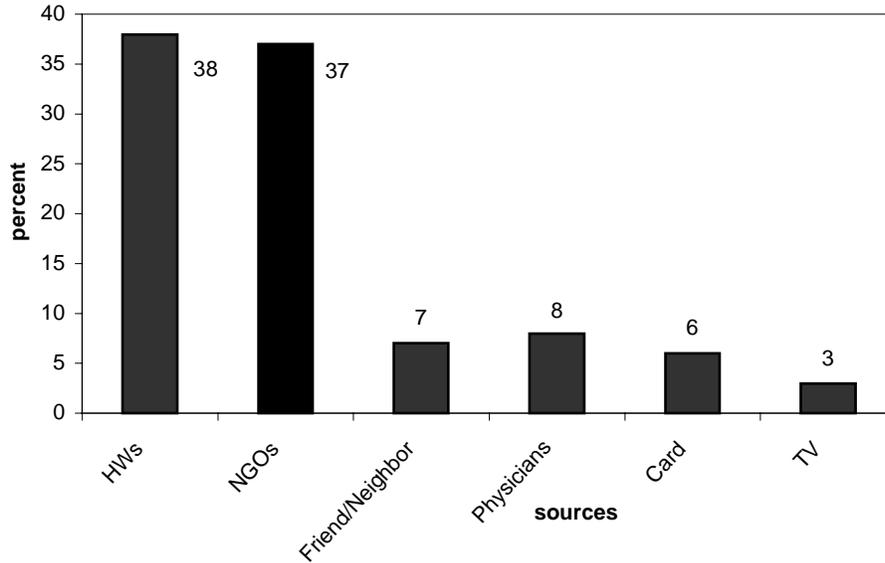
Chart 4: Respondent's knowledge about the number of times required to visit the Immunization Centre for full immunization of a child



Sources of information about age of completion of vaccination

Government and municipal health workers informed about 38% of the parents about the age of full immunization of a child (Chart-5). In Jessore, about equal percentage (37%) of the parents was informed by NGO workers. Neighbours and friends informed 7%, physicians advised 8% and interestingly, about 6% cases knew about it from the card. TV was the source of information in only 3% cases.

Chart 5: Sources of information about age of full immunization of a child

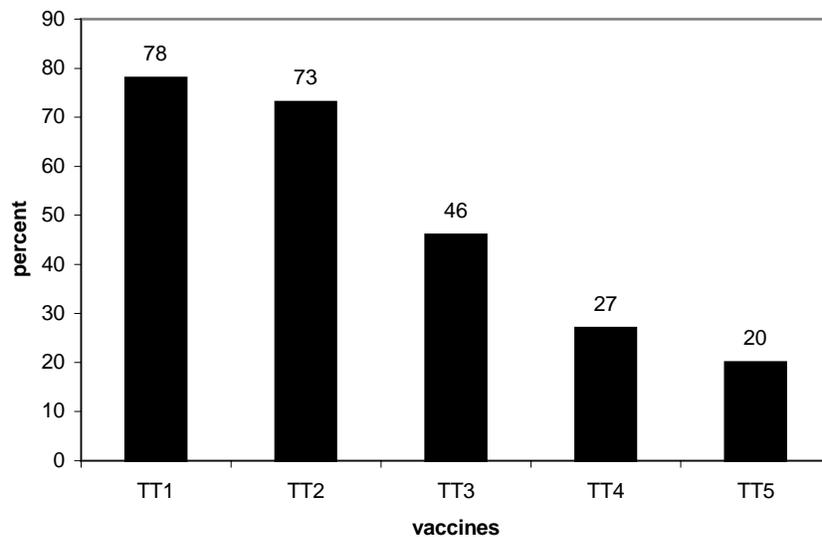


B. Routine TT immunization coverage levels of the women

Coverage levels

Seventy-eight percent of the women had access to a first dose of TT vaccine (based on crude data). 73% of the women received two doses. 20% had received all the 5 required doses (Chart 6). 22% of the women surveyed had not received any dose of TT vaccine.

Chart 6: Routine immunization coverage levels for TT of the women (15-49 years)

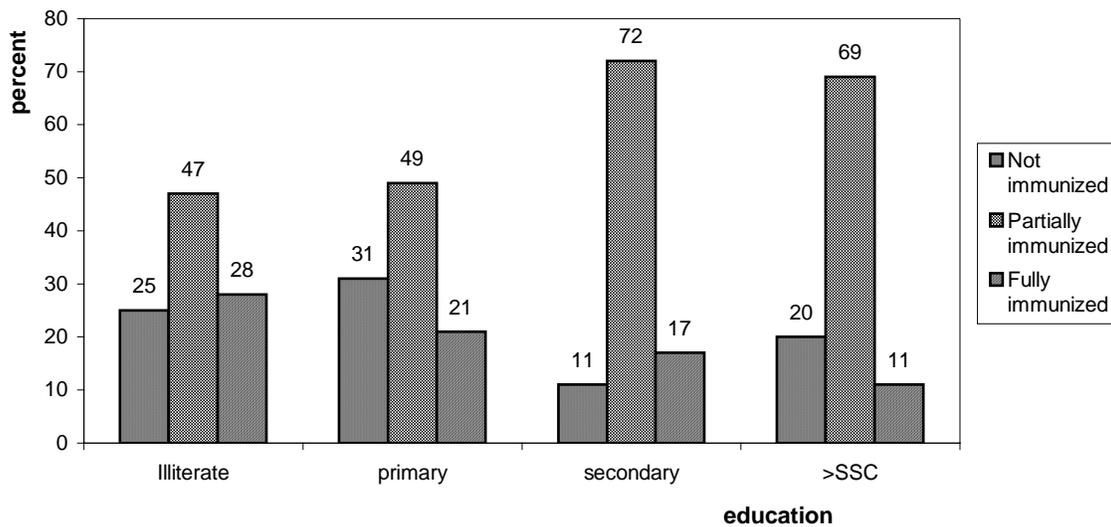


TT coverage status by education level of the women

Chart 7 shows TT status of the women by their level of education. It shows that education was positively associated with access to TT vaccine, but negatively with the completion of 5 doses of TT vaccines required for full immunization for lifetime protection.

The lowest access rate (47%) to TT was found among the illiterate women and the highest (72%) among those having secondary education. On the other hand, 28% of the illiterate women were found to have received 5 doses of TT, whereas only 11% women with higher secondary or above education were fully immunized.

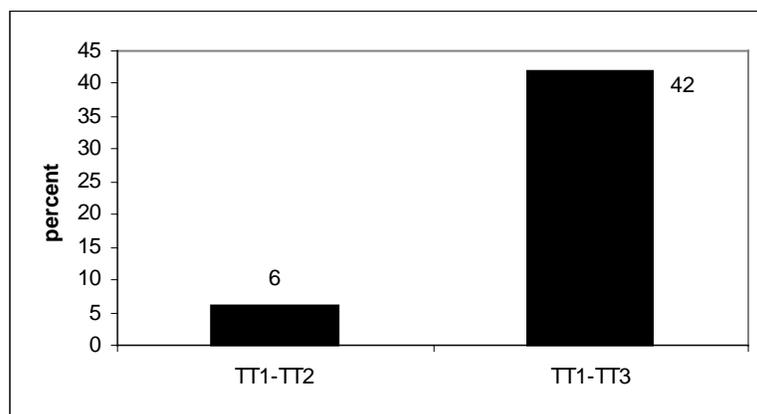
Chart 7: Distribution of TT status by education level of the women



Dropout rates for TT immunization

The dropout rate from first dose of TT vaccine to second dose was 6% and the dropout rate from first dose of TT vaccine to third dose was 42% (Chart 8). Only 28% of the women had TT immunization cards and they were lost in another 49% cases. 22% never had a card.

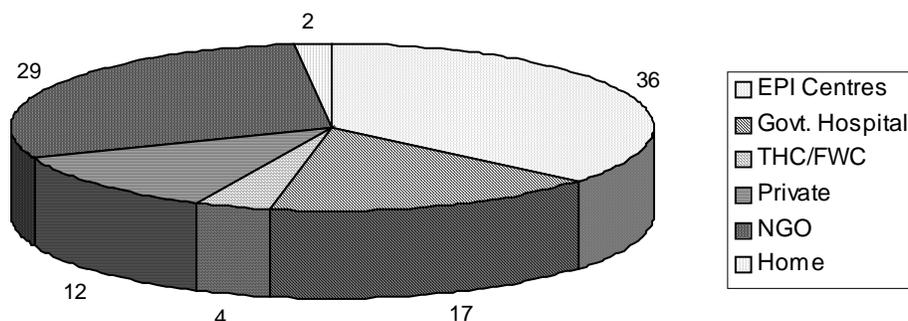
Chart 8: Dropout rates for TT immunization



Providers of TT immunization

Chart 9 shows that 36% TT immunization was provided from municipal EPI centers, 29% from NGOs, 17% from government hospitals, 12% from private places, and 4% from THC/FWCs .

Chart 9: Providers of TT immunization



Reasons for non-immunization and partial immunization of the women

22% women were not immunized and 58% were partially immunized. Table 4 shows that among the non-immunized women, 63% women were not immunized because they were unaware of the need of immunization and 30% reported that there was no provision of TT vaccine in the public health program when they had their pregnancies. On the other hand, the major reasons cited for partial immunization were: a) unaware of need to return for subsequent doses of immunization (51%) and b) health workers did not specify the date to return for the next dose (19%).

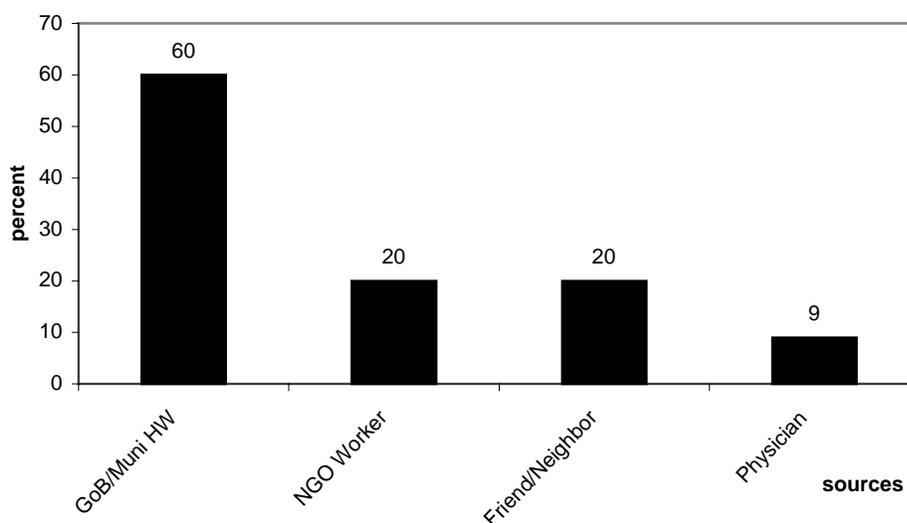
Table 4: Reasons for non-immunization and partial immunization for TT of the women

Reasons	Non-immunization (%)	Partial immunization (%)
Next dose is not due yet	-	20
Unaware of need for immunization	63	-
Date of returning for next dose was not specified by the HW	-	19
HW said 2/3 doses were enough for TT	-	3
Unaware of need to return for subsequent doses	-	51
“In our times TT immunization was not practiced”	30	-
No faith in immunization	-	-
Postponed until another time	-	3
Fear of taking injection	4	3
Vaccine not available	-	1
Cultural/religious reason	2	-

Information and motivation for routine TT immunization

Only 32 (15%) women could mention correctly the number of TT doses required (i.e. five doses) for lifetime protection. 2% women gave a wrong answer and a host of women (83%) did not know that they needed 5 doses of TT for that. Those who answered right, majority of them knew it from the Government or municipal health workers (75%), NGOs were the source of information in 25% of the cases and relatives and neighbors were the source for 16%. Another question was asked, “who motivated you to take the last dose of TT you took?” Chart 10 shows that majority of them said that Government and/or municipal health workers (60%) motivated them. Relatives/ friends/neighbours motivated them in 20% of the cases, and another 20% were motivated by NGO workers.

Chart 10: Sources of information and motivation for routine TT immunization



C. Coverage levels in the seventh NID campaign

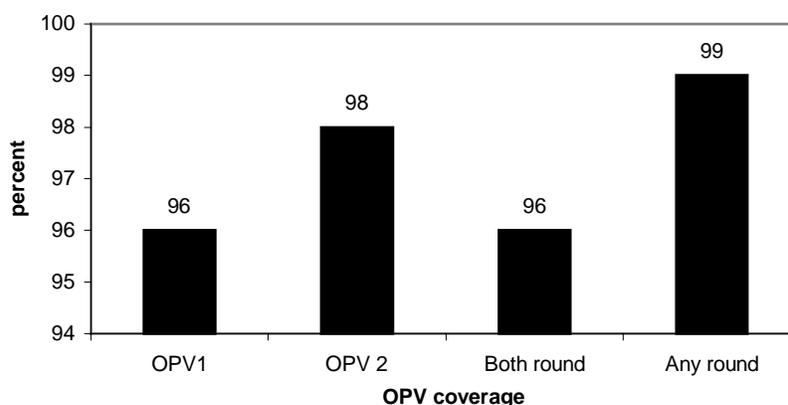
OPV coverage

Ninety-six percent of the children below 5 years of age received OPV during the first round and 97% during the second round of the 7th NID Campaign. In 96% cases children received OPV in both the rounds; while 99% children received OPV in at least one round of the 7th NIDs.

High potency Vitamin A coverage

During the second round of the seventh NID Campaign a high potency vitamin A capsule was also administered to about 89% children between one and five years of age.

Chart 11: Coverage of OPV during the 7th NID campaign



Reasons for non-immunization of OPV

The reasons for not receiving OPV during the first round included: a) child was absent/ away from home on the day of NID (23%); b) parents were unaware of the NID Campaign (15%); c) parents were busy with other activities (15%); and NID site was too far from their home (15%).

The major reasons for non-immunization during the second round were: a) parents were not aware of NID campaign (30%) and b) they were busy with other work (20%).

Table 5: Reasons for non-immunization of OPV during 7th NID campaign

Reasons	1st round N=13 (%)	2nd round N=10 (%)
Unaware about NID	15	30
Rain	15	10
Busy for other activities	15	20
Not given as the child was sick	8	10
Site too far	15	10
Child away from home	23	10
Waited for home visit	8	-
Religious/Social barrier	-	10

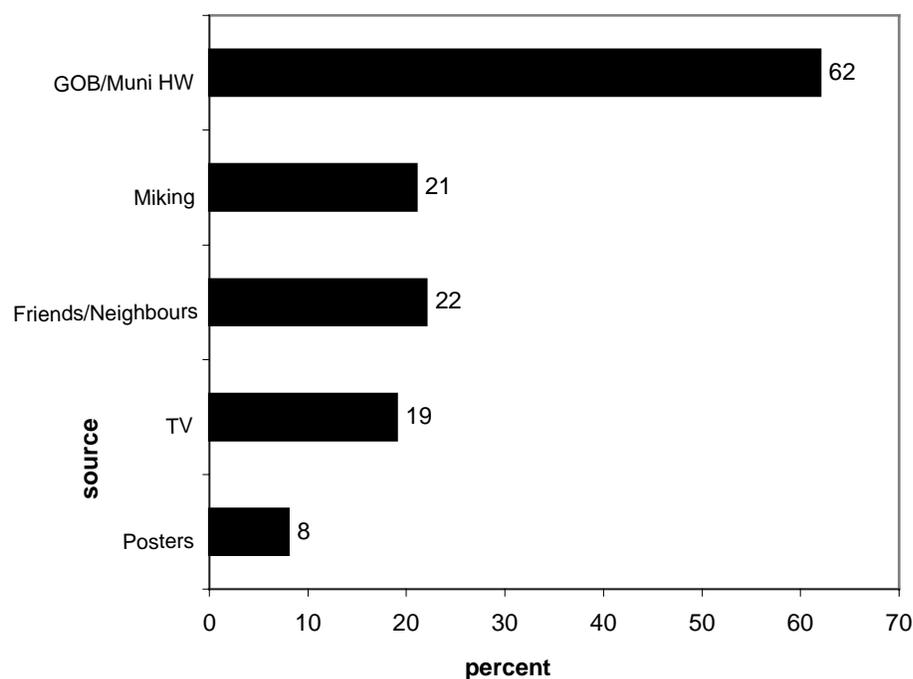
Places of vaccination during the seventh NIDs

Almost all (98% in both the rounds) children received OPV from the NID vaccination sites. Two children in the first round and five children in the second round received vaccines at home during household visit (child- to- child search).

Source of information about the second round of seventh NID campaign

62% of the parents said that they received the information of the 2nd round of the 7th NID from the municipal health workers. 22% got the information from friends/neighbours, 21% from miking, and 19% from television. In Jessore however, unlike other places, 8% got the information from posters (see Chart 12).

Chart 12: Sources of information about the seventh NID campaign



Discussion

The survey showed that 96% of the children of 12-23 months of age had access to routine immunization. However, the dropout rate was 6% from DPT1 to DPT3 and 15% from DPT1 to measles vaccine. The invalid dose was 6% for DPT1 and another 3% for measles vaccine. Another 3% children had not been immunized at all.

There was no sex differential in terms of access to immunization. However, dropout rates for all antigens are relatively higher among the girls than that of the boys.

Child immunization cards were lost in 41% of cases and 6% cases had no cards. 49% women had lost their cards and 22% never had the cards. The absence of cards has serious implications as it may mean that when a child comes to the immunization session for the second or subsequent doses, the vaccinators will have to immunize without accurately knowing the date of birth of the child and the date of previous immunization. This is another factor likely to increase the number of invalid doses given. This is also true for TT immunization where there is often a long interval between doses.

Education was positively associated with access to TT vaccine, but negatively with the completion of 5 doses of TT vaccines required for full immunization for lifetime protection. The lowest access rate (47%) to TT was found among the illiterate women and the highest (72%) among those having secondary education. On the other hand, 28% of the illiterate women were found to have received 5 doses of TT, whereas only 11% women with higher secondary or above education were fully immunized.

During NID, 96% received OPV in both rounds of the 7th NID campaign and 99% children received the vaccine in at least one round. Vitamin A coverage was only 89%. This indicates that although second round shows a better scenario, there are areas for improvement especially for vitamin A coverage. It is evident from this survey that the health workers should emphasize on distributing Vitamin A as well. The program should look into the supply issue.

Municipal Health Workers (62%) were the most important source of information of the NIDs in this area, followed by neighbours (22%), miking (21%) and TV (19%). Posters, as a source of information of NIDs was reported by only 8% of the parents.

Conclusions and Recommendations

Coverage levels for routine immunization of children

Access to routine immunization and low full immunization

This survey found that the access to routine immunization for children in Jessore Municipality was good with 96% of the children receiving a first dose of DPT. But this percentage was reduced to 73% for fully immunized children (valid data). This important shortcoming can be mainly attributed to the lack of knowledge on the importance of full immunization leading to dropouts and also to a number of invalid doses and uncorrected missed opportunity for BCG.

This indicates the poor quality of screening, inadequate knowledge or lack of motivation of the service providers. This situation could be improved by proper screening of eligibility of clients for each antigen at the time of vaccination, and by adequate counseling of mothers by the service providers.

The dropout rates

The dropout rates could be reduced to acceptable levels^{5,6,9} by:

- providing better counseling to parents/caretakers about the importance of each child, irrespective of sex, receiving all the required antigens before 12 months. They also require advise about when and where they should take their child for the next dose. Most children will need to attend 4 immunization sessions. 27% of the children dropped out because their parents/caretakers did not know that they were required to return to the EPI center for subsequent doses. 18% parents did not take their children for immunization as their children were sick. Parents need to be informed that minor illnesses are not a barrier for immunization.
- undertaking appropriate Behavior Change Communication (BCC) activities through the mass media and service providers to increase awareness of the need for children to receive all the doses of the disease specific antigens. Use of attractive posters for giving information should be tried more.
- providing refresher training and orientation to the service providers for counseling parents. It is apparent from the results of the survey that they lack the relevant technical skills and/or motivation for counseling. Some parents reported that they had never received any immunization information from a health worker and others complained that they had not been spoken to at all.
- emphasizing the need to retain and use vaccination card.

Coverage levels for TT vaccination

Access to TT vaccine (TT1) was fairly good but the rate of dropout after the second dose was very high. The coverage of 78% for TT1 reduced to 20% for TT5. 22% was not immunized at all. 51% were unaware of coming back for subsequent doses. A woman of reproductive age needs to receive five doses of TT at appropriate intervals to acquire immunity for rest of her reproductive life. TT coverage is likely to be improved by:

- checking the TT status of all women between 15-49 years at antenatal check ups and at routine child immunization sessions to see whether the mother or female caretaker is eligible for any dose of TT and provide a dose of TT if it is required
- undertaking appropriate BCC activities to increase awareness of the women of childbearing age of the need for five doses of TT vaccinations irrespective of education level.
- providing refresher training to the service providers of the TT vaccination requirements.

Coverage levels for the seventh of NIDs

4% children in the first round and 3% children in the second round of the 7th NIDs did not receive OPV. 96% children received OPV in both the rounds. It still means that there were some children who received only one dose of OPV or were not immunized at all. This occurred at a time when every child under five years old should receive a dose of OPV in each round of NID campaign in order for Bangladesh to achieve its goal of being a polio free country.

Improvements might be made by:

- increasing and improving the BCC activities to ensure that each parent/caretaker is aware that each and every child must receive polio vaccine during both rounds of each NID campaign planned in 2000;
- paying particular attention to immunization in remote areas, where there is a shortage of health staff and in those areas known to have low OPV coverage in earlier NIDs.

More concentration is needed to maintain this level and the proper monitoring should be continued.

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Annex - A

The following are extracts from **Anthony G Turner, Robert J Magnani and Muhammad Shuaib's** article entitled **"A not quick as quick but much cleaner alternative to the Expanded Programme on Immunization (EPI) cluster survey design"** published in the *International Journal of Epidemiology* in 1996, volume 25, Issue No. 1, pages 198-203.

The standard EPI Cluster Survey Design

"The sample design for the EPI Cluster Survey is a two stage design involving the selection of 30 primary sampling units or 'clusters' (usually village or other area units), from which 210 children with a target age range (usually 12-23 months) are chosen, seven children per cluster. The sample size of 210 children (per domain or stratum) is mandated by the desire to estimate the level of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect (i.e. *deff*) of 2.0. Based upon prior experience with immunization coverage surveys (primarily in the US), 30 clusters are generally thought to be necessary to yield sufficiently reliable estimate."

"In the standard design, clusters are chosen from a list of primary sampling units (i.e. villages, urban communities, census enumeration areas etc.) through systematic random sampling with probability proportional to estimated size (*ppes*). The latest estimates of cluster population sizes, which are assumed to be proportional to the number of children in the target age group in each cluster, are typically used as measures of size. The 30 clusters so chosen are then visited by survey field staff who carry out the second stage of sample selection and conduct the household interviews. "

"The original EPI design called for sample children to be chosen randomly from a list of all eligible children in each sample cluster. However, because the creation of lists of households and children tends to be time consuming, costly, and unfeasible in some settings, this procedure is only infrequently used in actual practice. Instead, one of several simplified second stage sampling procedures is commonly used. In one variant, children are selected by first choosing a random direction from a central location in a village or community (e.g. by spinning a bottle). The number of households in that direction to the edge of the community is then counted, and one household is randomly chosen to be the first sample household. Subsequent households are chosen by visiting the nearest neighboring households until information has been gathered on seven children. In a yet simpler variant, a direction from a central starting point is randomly chosen as described above and households are contacted as the interviewer moves in the chosen direction until the required information has been gathered for seven children."

"The second stage sampling methods described above are 'quota sampling procedures' and some of the problems resulting from the use of this approach have been noted over the years."

"First, quota sampling does not ensure that every eligible member of the target population has a known, non-zero chance of being selected. Hence, the standard EPI design, as it is usually applied, is not a true probability sample design."

"A second problem concern sampling weights. However, since measures of size in sampling frames are often inaccurate due to census errors and changes in population since the census was taken, application of the standard EPI Cluster Survey method does not automatically result in a self weighting sample. The survey data must be weighed in order to yield unbiased estimates. However, since selection probabilities are not known in most EPI Cluster Survey applications, sampling weights can not be calculated."

"Thirdly, a computer simulation study demonstrates that the EPI Cluster Survey based upon quota sampling at the second stage of sample selection is considerably more prone to sampling bias than conventional cluster sampling, particularly where immunized children are 'pocketed' within clusters. "

"Finally, there is the issue of how second stage sample selection should proceed in surveys with multiple measurement objectives."

Annex C

EPI Coverage Survey in Jessore Municipality List of clusters identified for survey

Mouza name	Total Population	Cluster Number
Barandi para (Khaldha Roa)	2258	1
College para	1062	2
Ghope	11211	3, 4
Hatkhola	804	5
Jailkhana area	3389	6
Loan office para	4377	7
Mollah para 3 rd colony	1272	8
Mollah para	2870	9
Purba Barandi Nath para	3910	10
Pashim Baarandi Nath para	1230	11
Arabpur	2518	12
Bidhu Bhushan Road	1562	13
Kazi para	3622	14
Khorki	1460	15
Mosjid para	883	16
Niribili	1692	17
Puratan Kasba	4206	18
Railway Ghat	1756	19
Sastitala	3497	20
Bogchar	1216	21
Chanchara Ratpara	3074	22
Chanchra Bhula Colony	1564	23
Nazir Shankarpur	5552	24
Nilgonj	541	25
Shankarpur (RK Mission RD.)	4432	26
Bejpara	10889	27,28,29
Shankarpur	4793	30

Annex D

EPI Coverage Survey in Jessore Municipality

Never vaccinated children identified by Cluster

Mouza name	Total Population	Cluster Number	Never Vaccinated Children
Barandi para (Khaldha Roa)	2258	1	1
College para	1062	2	-
Ghope	11211	3, 4	1
Hatkhola	804	5	-
Jailkhana area	3389	6	-
Loan office para	4377	7	-
Mollah para 3 rd colony	1272	8	-
Mollah para	2870	9	1
Purba Barandi Nath para	3910	10	-
Pashim Baarandi Nath para	1230	11	-
Arabpur	2518	12	-
Bidhu Bhushan Road	1562	13	2
Kazi para	3622	14	-
Khorki	1460	15	-
Mosjid para	883	16	-
Niribili	1692	17	-
Puratan Kasba	4206	18	1
Railway Ghat	1756	19	-
Sastitala	3497	20	-
Bogchar	1216	21	-
Chanchara Ratpara	3074	22	-
Chanchra Bhula Colony	1564	23	-
Nazir Shankarpur	5552	24	-
Nilgonj	541	25	-
Shankarpur (RK Mission RD.)	4432	26	-
Bejpara	10889	27,28,29	-
Shankarpur	4793	30	-
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Acknowledgements

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